Pajaro River Watershed Integrated Regional Water Management Plan Update
Project Solicitation Form

PROJECT OVERVIEW

General Project Information

Project Title:	Integrated Aquifer Enhancement Program for the Pajaro Valley
Project Location:	Pajaro Valley (cities of Watsonville and Pajaro, counties of Santa Cruz and Monterey)
Estimated Cost:	$1,500,000

Brief Project Description (1 to 2 sentences):

This project implements aquifer enhancement projects through storm water capture and returning of excess surface flows to the aquifer, convening stakeholders to implement community-based water supply projects, and implement an incentive-based program for demand management. Increasing groundwater recharge would help to reduce overdraft, thereby decreasing saltwater intrusion occurring along the coast. Projects can also help to reduce nutrient and sediment flows to surface water systems, and improve hydrologic function in support of stream and wetland systems.

Project Proponent Information

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Other participating agencies/organizations (if applicable):

University of Santa Cruz, Pajaro Valley Water Management District, Natural Resources Conservation Service, California State University Monterey Bay, Community Water Dialogue (regional stakeholders)

DETAILED PROJECT INFORMATION

Description

Please provide a description of your project (including the location) and its purpose, what will be constructed and/or implemented, how the project will function, the area(s) and/or entities that will be affected by or will benefit from the project, and any potential obstacles to implementation.

This project focuses on the role of Managed Aquifer Recharge, and supporting components, as a part of the Integrate Aquifer Enhancement Program in the Pajaro Valley. This project works in collaboration with the efforts of the Community Water Dialogue in furthering conversation and innovative projects that address the water supply issue in the Pajaro Valley. This project also recognizes the other projects that are occurring in conjunction with this project such as the Irrigation Efficiency projects proposed by the Agricultural Water Quality Coalition, and the specific Harkins Slough project proposed by the Coalition and PVWMA. At the heart of this project is an expansion of MAR with support from the efforts of the Community Water Dialogue and their, and others, research into how to better incentivize these types of efforts that address the water supply issue.

Through a partnership between the Resource Conservation District of Santa Cruz County, University of Santa Cruz, Pajaro Valley Water Management District, Natural Resources Conservation Service, and the California State University Monterey Bay, this project will assess scientific, technical, and social implications of developing distributed storm water capture and managed recharge systems, that will combine surface and subsurface resources to improve both the supply and quality of available fresh water. A series of aquifer recharge basins that put excess rainy season surface flows into available aquifers. The success of these basins relies on location-specific analysis to ensure effective percolation to the aquifer and monitoring and quantification of improvement success. Our request for will allow permitting and construction of additional 3-4 basins on private farmland currently under production. It is estimated that each basin could yield between 200 AF of recharge annually.

The process by which this model will be developed and implemented is the Community Water Dialogue, a community water "think tank" that began in 2010 in the Pajaro Valley. The Dialogue is comprised of members of the agricultural industry, local technical service agencies, the Resource Conservation District, land conservation organizations, and local government including managing water agencies of the basin. The Dialogue is a communication and project coordination mechanism charged with defining and implementing projects in the basin. Results to date include installing a pilot wireless irrigation monitoring network to increase irrigation efficiency, providing input on PVWMA's Basin Management Plan and efficiency trainings for growers and irrigators. Funding support will allow the implementation of these technologies and trainings to be scaled up to meet a portion of the 5,000AF target.

Figuring out how to measure and incentivize positive outcomes for water supply with the agriculture industry is necessary component to addressing the aquifer overdraft issue. Over the last year a series of standardized metrics have been developed to measure improvements to water supply and quality through conservation practices by the berry industry. These metrics have been tested and documented through a pilot study at nine ranches in the Pajaro Valley to quantify environmental "performance". The next objective is to fully implement the structure of economic and non-economic incentives to motivate grower action. Our goal is expanding to 21 additional ranches over the next three years. The findings from this effort will help to establish the performance metrics and incentives as a mechanism to deliver more aquifer recharge projects and enhance water use efficiency throughout the valley.

Technical Feasibility

Discuss the technical feasibility of the project. If possible, cite references that contain information about the proposed project and detail the technical feasibility of the project.

Proposed work is technically feasible, as shown through operations of the Harkins Slough managed recharge system, including considerable benefit to water quality at the same time as water supply is being enhanced (Racz et al., 2011, Schmidt et al, 2011a,b). That said, considerable work remains to be done linking water supply and quality objectives, monetizing recharge to

develop a sustaining model for project development, and getting environmental data online for use by operators and regional stakeholders. Racz, A. J., A. T. Fisher, C. S. Schmidt, B. Lockwood, and M. Los Huertos, The spatial and temporal dynamics of infiltration during managed aquifer recharge, as quantified using mass balance and thermal methods, Ground Water, doi: 10.1111/j.1745-6584.2011.00875.x. Schmidt, C. S., A. T. Fisher, A. J. Racz, B. Lockwood, and M. Los Huertos, Linking denitrification and infiltration rates during managed groundwater recharge, Env. Sci. & Tech. dx.doi.org/10.1021: es2023626.Schmidt, C. S., A. T. Fisher, A. J. Racz, M. Los Huertos, and B. Lockwood, Rapid nutrient load reduction during infiltration as part of managed aquifer recharge in an agricultural groundwater basin, Hydrol. Processes, doi: 10.1002/hyp.8320, 2011.

Pajaro River Watershed IRWM Regional Goals & Objectives

Put an X next to any goal that the proposed project will achieve.

	Water Supply
x	1. Meet 100% of M&I and agriculture demands (both current and future conditions) in wet to dry years including the first year of a drought.
x	2. Meet 85% M&I and 75% agriculture demands (both current and future conditions) in second and subsequent years of a drought.
	3. Identify and address water supply needs of disadvantaged communities in the Pajaro River Watershed.
0	4. Implement water conservation programs to reduce M&I and agricultural water use consistent with SBx7-7 and CVPIA.
	5. Maximize the use of recycled water during the irrigation season and expand other uses of recycled water.
x	6. Optimize the use of groundwater and aquifer storage.
x	7. Maximize conjunctive use opportunities including interagency conjunctive use.
	8. Optimize and sustain the use of existing import surface water entitlements from the San Felipe Unit.
x	9. Maximize the beneficial use of existing local water supplies while protecting existing surface water rights.
	Water Quality
x	1. Meet or exceed all applicable groundwater, surface water, wastewater, and recycled water quality regulatory standards.
	2. Identify and address the drinking water quality of disadvantaged communities in the Pajaro River Watershed.
X	3. Protect groundwater resources from contamination including salts and nutrients.
x	4. Address impacts from surface water runoff through implementation of Best Management Practices or other surface water management strategies.

	5. Meet or exceed delivered water quality targets established by recycled water users.

Flood Protection

x	1. Implement flood management strategies throughout the watershed that provide multiple benefits.
	2. Reach consensus on the Pajaro River Risk Reduction Project necessary to protect existing urban areas and infrastructure from flooding and erosion from the 100-year event
	3. Work with stakeholders to preserve existing flood attenuation by implementing land management and conservation strategies throughout the watershed.
x	4. Develop approaches for adaptive management to minimize maintenance requirements and protect quality and availability of water while preserving ecologic and stream functions.
	5. Provide community benefits beyond flood protection such as public access, open space, recreation, agriculture preservation and economic development.

Environmental Protection and Enhancement

x	1. Address opportunities to enhance the local environment and protect and/or restore natural resources, in cooperation with landowners, when developing water management
	2. Improve biological and cultural resources, including riparian habitats, habitats supporting sensitive plant or animal species and archaeological/historic sites when
x	3. Address opportunities to protect, enhance, or restore habitat to support Monterey Bay National Marine Sanctuary marine life in conjunction with water supply management
	4. Address opportunities for open spaces, trails, parks along creeks and other recreational projects in the watershed that can be incorporated with water management

Integration and Coordination

Put an X next to any Resource Management Strategies (RMS) that the proposed project will address.

Reduce Water Demand	Agricultural Water Use Efficiency	x
	Urban Water Use Efficiency	
Improve Operational Efficiency and Transfers	Conveyance - Delta	
	Conveyance - Regional/local	
	System Reoperation	
	Water Transfers	
Increase Water Supply	Conjunctive Management & Groundwater Storage	x
	Desalination	
	Precipitation Enhancement	
	Recycled Municipal Water	
	Surface Storage - CALFED	
	Surface Storage - Regional/local	~~0~~
Improve Water Quality	Drinking Water Treatment & Distribution	
	Groundwater Remediation /Aquifer Remediation	~~0~~
	Matching Quality to Use	x

	Pollution Prevention	
	Salt & Salinity Management	x
	Urban Runoff Management	0
Improve Flood Management	Flood Risk Management	x
Practice Resources Stewardship	Agricultural Lands Stewardship	x
	Economic Incentives (Loans, Grants, & Water Pricing)	X
	Ecosystem Restoration	0
	Forest Management	
	Recharge Area Protection	x
	Water-Dependent Recreation	
	Watershed Management	x
Other Strategies	Crop Idling for Water Transfers	
	Dewvaporation or Atmospheric Pressure Desalination	
	Fog Collection	
	Irrigated Land Retirement	
	Rainfed Agriculture	
	Waterbag Transport/Storage Technology	

Please describe:	Managed Aquifer Recharge can provide additional water supply into the aquifer by capturing storm water runoff and infiltrating it into the aquifer. During infiltration, some filtration of the storm water occurs through the soil. There is also added watershed and ecosystem benefits in the recharge basin.

List the projects that were integrated to develop a single proposed project, if applicable.

Recharge Basins, Community Water Dialogue, Performance-based Incentives

List the agencies and organization that are working together to implement the project.

RCDSCC, UCSC, CSUMB, NRCS, PVWMA,

Climate Change Mitigation and Adaptation

Put an X next to any climate change adaptation or mitigation strategy the proposed project will contribute to.

Adaption Strategies

X	Improve water supply reliability
X	Expand conjunctive use of multiple water supply sources
X	Increase water use and/or reuse efficiency
X	Provide additional water supply
X	Promote water quality protection
0	Reduce water demand
0	Advance / expand recycled water use
0	Promote urban runoff reuse
	Address sea level rise
X	Address other anticipated climate change impacts
	Improve flood control
X	Promote habitat protection
	Establish migration corridors
	Re-establish river-floodplain hydrologic continuity
	Re-introduce anadromous fish populations to watershed
	Enhance and protect watershed forest and meadow systems

Please describe:

Mitigation Strategies

0	Increase water use efficiency or promote energy-efficient water demand reduction
	Improve water system energy efficiency
0	Advance / expand recycled water use
0	Promote urban runoff reuse
	Promote use of renewable energy sources
	Contribute to carbon sequestration

Please describe:

Does the proposed project reduce regional greenhouse gas emissions and/or improve energy efficiency? If so, explain how.

Yes, through reduction in pumping, energy will be saved and GHGs reduced.

Social Benefits and Impacts

Does the project provide specific benefits to disadvantaged communities and/or Native American tribal communities? If so, explain.

This project would be focused in the Pajaro Valley Water Management Agency jurisdiction and would benefit the communities of Watsonville and Pajaro, both of which are being impacted by saltwater intrusion and aquifer overdraft.

Does the project address any known environmental justice issues?

No.

Project Cost

Total Estimated Capital Cost	$1,500,000
Annual Operation & Maintenance (O&M) Cost	$10,000
Cost Basis (Year)	%
Source(s) of Funding for Capital	RCD, NRCS, CSUMB, UCSC (all grants these organizations qualify for)
Source(s) of Funding for O&M Cost	RCD, NRCS, CSUMB, UCSC (all grants these organizations qualify for)
Project Life (years)	3
Provide link to project cost estimate, if available	

Economic Feasibility

Has a benefit:cost or cost effectiveness analysis been completed for your project? If so, please cite reference and briefly summarize. If no economic analysis has been completed for the project, the project may receive zero points out of a possible 100 points for the financial considerations criteria unless the project is a DAC project. If the project is not a DAC project but the B:C ratio is expected to be greater than 1, please provide a justification. The lack of an economic analysis may also affect the project's readiness score.

Managed Aquifer Recharge:
A rough calculation of the cost to get 5-6 recharge sites up and running, annual monitoring, data online, some water quality work, could be about $900,000 in direct costs over 3 years. Assuming that got 700-800 ac-ft/yr into the ground, which is possible based upon initial findings of existing sites, there is a cost of about $1500/ac-ft of recharge into the aquifer. This is a lot less than the $4000 ac-ft to be developed by the PVWMA BMP - and the costs for MAR should go down with time - this budget includes a lot of set up, support to do studies needed to demonstrate effectiveness, etc, which would not be needed for the long term.
Community Water Dialogue:
To administer the dialogue, coordinate working groups of stakeholders, and implement projects it is estimated to cost approximately 300,000 over 3 years.
Performance-based Incentives:
To measure performance, analyze data and certify incentives, it is estimated to cost 300,000 over 3 years.

If known, please provide the Benefit:Cost Ratio.

Provide a detailed discussion of the benefits the project will provide. To the extent possible, quantify changes and benefits (e.g. water quality and water supply benefits) that will result from project implementation; otherwise, describe benefits qualitatively.

This would provide water quality benefits through active recharge basins throughout the Pajaro Valley. On average, a basin could get between 100-200 acft/year recharged into the aquifer. Depending on the number of sites in the Pajaro Valley, this could greatly increase the amount of water recharging into the over drafted basin, helping to reduce saltwater intrusion. The Community Water Dialogue will facilitate 3-4 water saving initiatives per years based upon community input and act as a forum for new ideas around reducing aquifer overdraft. The performance-based incentives element will provide economic and non-economic motivation to implement BMPs to improve water quality and supply performance for agricultural operators.

Project Readiness

Proposed Project Start Date:	6/1/13
Anticipated Project Completion Date:	6/1/16

Please Indicate the status (pending, in process, complete) of the following.

Project Element	Status	% Complete	Estimated Completion Date
Feasibility Study	in process	50	4/1/13
Preliminary design	pending		4/1/13
CEQA/NEPA	pending		6/1/13
Permit Acquisition	pending		7/1/13
Construction Docs	pending		6/1/13